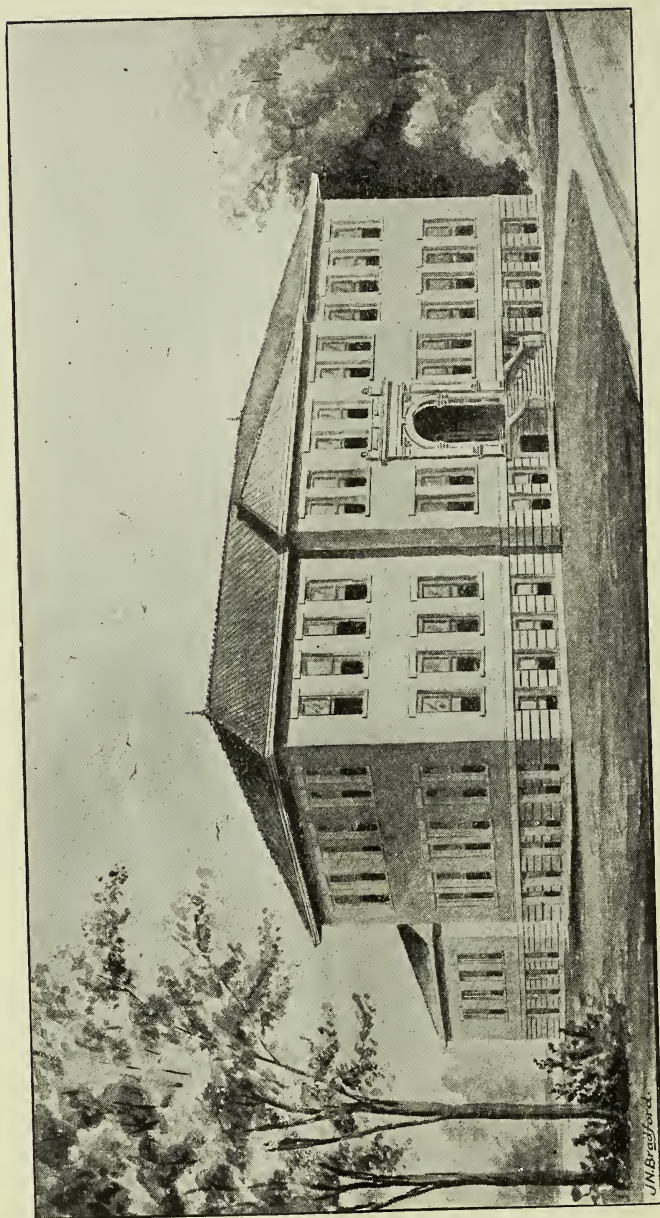


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THE NEW VETERINARY BUILDING.

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### EDITORIAL CHAT.

The increased interest shown in the Agricultural Students' Union at the recent meeting is very encouraging to those who have the welfare of the organization at heart. The new lines of work proposed, namely, the work in plant building and that of an agricultural correspondence course are most commendable features, and it is most earnestly hoped that these may soon become a part of the work. The possibilities of this organization if properly conducted are great, and it is believed that the members are coming to appreciate the fact. If they will take hold of the work as they should there is no reason why this Union cannot be one of the most efficient means that could possibly exist of advancing agriculture and agricultural education in the State. The time is ripe for the extension of this sort of work and the constantly increasing number of students going out from the University cannot but give increased possibilities to the various enterprises of the Union. The College of Agriculture is no longer young and the obstacles which once existed to the success of this organization are rapidly dis-



appearing. It is hoped that the inspiration received from this meeting will be the leaven which shall cause a great increase of interest and an awakening to the possibilities that have so long lain dormant.

We trust that the Agricultural Students' Union will straightway become a most important factor in the development of agricultural education in the State and a wonderful aid to its agricultural progress. If the members of this Union will seize upon the advantages now open to them through the organization, and by a systematic, coöperative policy develop to the highest degree the features which it is the object of this organization to promote, we firmly believe that it will assume an importance in the agricultural educational development of the State, entirely comparable to that of the University of which it is the offspring.

There is a great awakening of interest in agricultural affairs at Cornell University and the people of the State as well as those in authority at the institution are demanding a great advancement in the Agricultural College. President Schurman is one of the most enthusiastic supporters of this movement and the funds for the new building which the college has so long needed will undoubtedly be secured at no distant date. New York is realizing that she is falling behind western institutions, especially in the matter of equipment and that it is high time a most pronounced effort be made to secure greater facilities for work.

An effort is also being made to secure the election of Professor Bailey of that institution, who is so widely known as an agricultural educator, for dean of the college to take the place of Professor Roberts, who retires this year on account of his age. As is well known Pro-

fessor Bailey is a man most admirably fitted for the office and one whose ability and fame as an agricultural educator is unsurpassed. He is probably the best known man in the county in the line he represents and surely no man is more enthusiastic or energetic in his work. It is expected that this agitation will result in great good to the college and to the agricultural interests of the State, and it is believed that with an agricultural building commensurate with the needs of New York State the development of the college under such a man as Professor Bailey would be marvelous.

The bill for a new agricultural building at Washington asking for \$2,500,000 for this purpose was cut to \$1,500,000 in the committee. The immense growth of the Department in the last decade and its undoubted growth in the future necessitate an immense building if all departments are to be accommodated, and the reduction of the sum for this purpose is a great misfortune. To be sure a million and a half dollars will build a large structure, but it is a short-sighted policy that allows a cramping of the Department in the near future when it is doing so very much for the welfare of the country. Surely its equipment should be proportional to that of other departments of the government. It is evident that some of our legislators are not awake to the possibilities of this Department or to the immense amount of work that it is doing.

Professor Fernow, the eminent Professor of Forestry, estimates that at the present rate of consumption the forests of the United States will only last thirty years. If this is a correct estimate, it is surely time that every force be brought to bear to secure proper legislation in forestry matters. A rational system of forestry is one of the most immediate

needs of the country, and with a President who is thoroughly awake to the needs along this line, and one who is as much interested in the matter as is President Roosevelt, it is hoped that something of importance may soon be done to preserve the forests of the country.

### **Agricultural Students' Union.**

The ninth annual meeting of the Agricultural Students' Union of Ohio was held Wednesday afternoon and evening, January 14, 1903 in Townshend Hall. A new feature of this year's meeting was the Agricultural Students' Reunion, which was held in the afternoon and early part of the evening. All alumni and ex-students of the College of Agriculture were invited to attend this reunion, and although not a very large number came, the reunion was a success and all present expressed their desire to have it made a regular feature at the meetings of the Union. The first session was held at 5 p. m. and was addressed by President A. D. Selby and Prof. C. S. Plumb. President Selby, in his address on "Agricultural Experimentation and Progress," traced the development of experimentation and showed that as new and more difficult problems came up before the experimenter, his methods became more and more efficient. He said that the station has as its work the lifting up and holding of the agricultural public to the front, or the advancement of agricultural science and knowledge.

Professor Plumb gave a talk on "A Lesson in Coöperation," in which he gave a very interesting account of the Copenhagen Coöperative Egg Association, showing what intelligent, systematic coöperation has done for the farmers of Denmark. He said that there was great prosperity among the agricul-

tural classes of Denmark today, not because of great agricultural possibilities, such as good soil, etc., for in fact the soil is poor, but because they made a careful study of their adaptabilities and of the needs of the English markets and then, by means of systematic, intelligent coöperation, they achieved success in their undertakings.

This closed the first session which was followed by the luncheon and general reunion. About ninety persons were present at the luncheon and this number was composed of members of the faculty, students, ex-students, alumni of the Agricultural College and representatives from the Experiment Station. Professor Selby acted as toastmaster and toasts were responded to by President W. O. Thompson, Professor Hunt and Director Thorne of the Experiment Station.

The regular meeting was held at 8 o'clock and consisted of the reports of the division directors and other addresses. The first report was that of the director of the Division of Agriculture, L. H. Goddard.

Tests were conducted during the past year by ninety-eight farmers in fifty-two counties of the State, having the following objects in view, viz:

1. To find out the best cereals for each type of soil in Ohio.
2. To find out what is lacking in these soils.

Tests were also made to ascertain how much it takes to put a pound of flesh on beef animals, and experiments are now under way to secure practical results along this line. A printed circular giving the plan and list of these experiments was sent out to a large number of farmers and much interest was taken in the tests. The director stated that of the ninety-eight farmers engaged in these tests only eleven were men who had been trained in agriculture at the Ohio

State University, and he made an appeal to agricultural students to give more assistance in this work.

The report of the Director of the Division of Horticulture, V. H. Davis, showed that there were thirty-eight persons engaged in making some experiments with certain fruits and vegetables. The variety tests were found to be the most popular, but the work was thought to have been most too wide and general and it was thought in the future the experiments should be such as would give positive or negative results. For the work of next year five variety tests of potatoes, strawberries, and some common garden crops were suggested.

The work of the Division of Dairying under Professor Decker has been a continuation of the work of previous years, but has given more definite and detailed results than formerly. He classes the factories of the State as private and coöperative, there being almost two of the former to one of the latter. There are 410 factories distributed in 59 of the 88 counties of the State, and of this number 143 are creameries, 68 skimming stations, 119 cheddar cheese factories, and 80 Swiss cheese factories.

Dairying is growing in the southwestern part of the State, but factories are lacking in the oil and coal regions. Some of the cheese factories are turning into milk stations. Knox county is the banner county of the State for Swiss cheese factories. Next year some experiments will be tried along the line of udder manipulation.

The report on apiculture, by John F. Cunningham, consisted of some general conclusions regarding bee culture, and showed that a good colony of bees well cared for and well housed are quite profitable. Professor Lazenby gave a few of his observations on bees and said that, contrary to a general belief, bees do not collect honey and pollen at the

same time, but that the pollen is collected early in the morning and honey later in the day. He also said that some of our classes of fruits are not very dependent upon bees as other insects perform this function also. Bees do not work on pears as much as on some other fruits, but flies are probably concerned in the pollination of pear blossoms.

The report of Mr. Miller of the Soils Division showed that, although good results were hard to obtain from people untrained in soil work, some very interesting facts were secured. Twelve hundred young men throughout the State were engaged in testing the acidity of soils. Only ninety reports were returned and of this number sixty-two reports from forty-four counties showed that some of the soils were acid. Eight hundred square miles, or 2 per cent. of the soil of Ohio was shown to be acid. The poorly drained upland and muck soils were acid, but the bottom lands were not. The educational feature of this work was thought to be quite as important as anything else.

The work in Economic Botany, under the direction of Professor Selby, was restricted to a study of oat smut. He showed that 6 per cent. of untreated oats in Ohio was lost through smut, and said that this loss is preventable. There is only one known practicable method of oat smut treatment and that is to treat the seed with formaline.

A resume of the reports by Mr. Waide showed that the number of experiments had been almost doubled and that the expense had been proportionately reduced. His recommendations for the following year were that the size of the plots be reduced, that it was not best to start too much work and that a new division, viz., that of Entomology, be created and that Mr. Parrott of the Experiment Station be given charge of it. He also said that the



reunion feature should be encouraged.

Professor Vivian spoke on the value and need of correspondence courses in agriculture, and suggested that the Union take the matter under advisement. Professor Hunt also spoke in favor of this, saying that he thought that this correspondence course would be a good and profitable work for the Students' Union.

Professor Hunt spoke on "A Division of Thremmatology," and suggested that such a division be established. Thremmatology as defined by Professor Hunt treats of the principles of heredity in plants and animals.

The same officers were re-elected with the exception of Secretary-Treasurer, Mr. V. H. Davis being elected.

C. B. H.

#### **State Farmers' Institute.**

The State Farmers' Institute held its annual session in the hall of the House of Representatives in the State House, Columbus, Ohio, on January 13 and 14. Both the morning and afternoon sessions of each day were very well attended by agriculturalists from all over the State.

This institute serves a very important part in the agricultural education of the present time. Here we find a mingling of farmers, institute workers, members of the Agricultural Experiment Station staff, agricultural college professors and students. Colonel J. H. Brigham, Assistant Secretary of the United States Department of Agriculture, was present and on the second day made a very forcible address upon the subject of "Irrigation of Arid Lands." He believes that the work of the government in the reclamation of the arid lands is not so much to build irrigation systems, but to encourage their construction by private companies or corporations and to regulate the water rights, not allowing them

to fall into the hands of monopolies. He is much opposed to the law for the irrigation of the western arid regions, claiming that the Irrigation Congress, which was so successful in securing the friends for this bill, was but a fraudulent breastworks of the transcontinental railroads who hold many millions of acres among the districts in question. Their efforts were actuated entirely by their selfish desire for gain which would result from the increased value of their lands.

Much stress was laid upon the value of agricultural education through the agencies of the agricultural colleges, experiment stations, farmers' institutes, farm journals and fairs, and it was pointed out again and again that all these forces are working together in perfect harmony. The discord which many delight in believing exists between scientific and practical agriculture was not even suggested and all remarks along this line showed the fallacy of any such belief. In many of the speeches were seen pictures of the deplorable negligence and bad management of a great portion of our farmers. L. P. Bailey spoke at length of the carelessness of farmers engaged in the milk and butter business. He said that the outlook for the dairy business in Ohio is indeed very bright, provided the people will adopt more cleanly and sanitary methods of handling their milk and butter. Very few farmers know how to make first-class butter, but put inferior products upon the markets, thus ruining the reputation of their product and creating excellent opportunities for oleomargarine manufacturers.

Professor Green spoke of the neglect of farmers to properly spray and provide good growing conditions for fruit trees. This is rapidly lessening the value of farm orchards. He said: "The time is not far distant when the so-called farmers' orchard will cease to exist, for the

difficulties to fruit growing, although now very many, are likely to increase. The industry is rapidly falling to the specialists and will ultimately fall to them entirely." In the discussions relating to the live stock industry, many illustrations of the inadequate shelter, scanty feeding and improper attention so commonly given to farm animals were recalled.

In Professor Plumb's discussion of "The Larger Responsibilities of the Stockman," he called attention to the fact that every person who permits the birth of an animal of inferior quality lowers to just that extent the reputation of himself, his country, his State and his nation.

In an excellent address, H. P. Miller spoke of "The Use of the Expert Judge." In substance he said: "Fairs should be made, not passive entertainments, but real educational institutions as was originally intended. They should be made the places for the exhibition of the finest types of farm stock and the judges should be compelled when placing the animals and making awards to call particular attention to the superior points in an animal and in every case to give the reasons for his selections. The awarding of prizes is not taken seriously enough and the success of fairs is too generally determined by the gate receipts instead of educational features."

A. F. Burgess gave an interesting talk in regard to the work of nursery and orchard inspectors as provided for by a law passed in May, 1902.

W. I. Chamberlain showed how he utilizes the force of gravitation in the arrangement of his barn. He has a bank barn, with elevated floors, a cistern in the bank and his granary in the basement.

E. P. Snyder has traveled "From Coast to Coast" and related many inter-

esting experiences of his journeys. He does not believe in making farming a life of drudgery, but encouraged the farmers to take advantage of some of the cheap railroad excursions and visit other parts of the country, for such journeys will surely bring both pleasure and profit.

C. A. McC.

### **Meeting of the Ohio State Board of Agriculture.**

On the day following the State Farmers' Institute the Ohio State Board of Agriculture met at the State House in the Hall of the House of Representatives. The morning session was devoted to addresses by Governor Nash and the President of the Board, the reports of the Treasurer and the Auditing Committee, and other business.

The afternoon session was composed of addresses for the promotion of agriculture, and certainly did not fall short of its purpose. Governor Jones, in his address entitled, "The Outlook," said among other things: "I believe that agriculture is now upon its ascendancy and is rapidly assuming the place it ought to assume. To destroy the feudal systems of England would be the greatest thing that could be done for agriculture. It is very fortunate that no such thing has ever existed in the United States.

"Farmers are engaged in a great occupation, but don't make much noise about it. Of the one and a half billion dollars worth of goods which we export annually three-fourths of it comes from the farm. Since agricultural colleges have been established we are doing four or five times as much business as we did previously.

"There is not enough patriotism among the farmers of America. There is too much nonsense about imported stock, for there is no reason why we cannot raise as good and even better stock



than they can across the ocean."

Colonel Brigham delivered an address on "How Organization of Capital and Labor May Affect the Interests of Farmers." He told farmers to diligently watch and inquire into the organization of vast corporations and when not operating to the public good to operate against them.

"Farmers should organize, educate, discipline and drill the land owners of this country in the methods of protecting their rights and interests. Every farmer, willing to do something for himself, his family and his nation, should join the Order of the Patrons of Husbandry."

Dr. Paul Fisher spoke of the work being done by the State Board of Live Stock Commissioners and the control of infectious diseases of live stock in Ohio. He told how this Board copes with infectious diseases of farm animals and suggested easy methods for farmers and dairymen to do likewise and invited their coöperation in this matter.

In the last address of the session, A. P. Sandles said in part: "In peace or war Ohio is never at the foot of her class; and it is fitting and proper that the citizens of Ohio remind the world that she is now a century old by making next year's State Fair a grand success.

C. A. McC.

### **Agriculture in the Rural Schools.**

A great deal of interest has been growing in education along lines relating to agriculture, and several high schools have introduced the study of agriculture in their courses as an elective. Where this is taken up with any degree of thoroughness, it of course requires a separate teacher for that work. This is a step in the right direction.

It is said that one student out of nine that graduate from the high school en-

ters college. Through the aid of the Boxwell law quite a large number of high school students come from the country. If those in the graduating class, who come from the farm, intend to go back to the farm for their life work, then it is highly important that they get some instruction in agriculture. For a farmer should be as well acquainted with his vocation as the banker or lawyer is with his. If business courses or manual training classes are had for the benefit of those who expect to enter the mercantile field, or one of the trades, then why not give the boy inclined to the pursuit of agriculture an equal training for his work?

Until recently agriculture was taught as a study only in agricultural colleges, and as the number of students entering college is very small compared to those that enter high school, consequently those that get instruction in agriculture were very much smaller, as only a small per cent. of those able to enter college entered the agricultural course. One reason that the number entering the agricultural colleges has been so small is that the farming people have not been awake to their needs and are not acquainted with the advantages of the agricultural colleges.

As the number of students in the colleges is small when compared with the number in the high schools, so also is the number in high schools small when compared with those in the common schools. In Ohio there are about 800,000 pupils in the first eight grades, or common schools, 45,000 in the high schools, and 6,000 in the colleges.

At present there are about two hundred township high schools in Ohio. As they are located in the country, usually in the center of the township, and attended by the children of farmers, most of whom will remain on the farm through life, some attention should be

given to agricultural training. But this can hardly be expected unless the instructors are interested in such work, or are themselves graduates of agricultural colleges. If the students are to be interested in their study they must have instructors who are interested in it also.

The courses in both the common and high schools in the cities are being changed from year to year with a view to providing instruction which shall relate more closely to the requirements of the store, the counting room, the work shop, and the professions. While there has been great activity in city educational affairs, the progress in the rural communities has been along very narrow lines. There should be a change made in the courses of study given in our rural schools. The township high school is the beginning of a change in our school system, and with the better organization of the rural schools will come very much better opportunities for the enrichment of the courses of study by the introduction of those subjects which are most directly related to the improvement of agriculture, and to the inculcation of a love of country life in the minds of the youth on our farms.

All around our country schools lies a wealth of material for most attractive and valuable studies which thus far have been neglected for lack of knowledge and skilled teachers.

In more recent years there has been great advancement in studies on those things in nature with which the farmer has to deal. The secrets of the air and soil, and those pertaining to plant and animal life are now in large measure the property of mankind. But, there is still needed in far greater number the skilled teacher to open the eyes of the farm boys and girls, to the natural objects amidst which they live, and to interest them in the study of natural things.

A great amount of work has been done by and under the direction of Profs. I. P. Roberts and L. H. Bailey, of Cornell University, in a system of nature study for the rural schools of New York, and in instructing teachers how to make such study effective. Nature study is not to be confounded with the systematic study of agriculture, for it is a different thing. However, nature study deals with the elementary facts and principles upon which the study of agriculture is based, and such study in our common schools would therefore be a preparation for higher study in agriculture in the high school and colleges.

The common plants and trees of the farm, the domestic animals, and the beneficial and injurious insects, in any agricultural region offer abundant material for nature study. Instruction about plants and animals may easily and naturally be connected with the study of English in the work in composition, which under the proper direction of the teacher will bring into practical use what the child is learning from day to day. Properly taught, nature study will not crowd out any essential branch of learning from the common schools, as a great deal of it would consist in studying the objects by observation outside of the regular recitation hours.

If our teachers in the common and high schools of the rural communities believed in agriculture there would be far more students in our agricultural colleges.

In many localities we find young people who are not interested in hearing addresses on agricultural topics. The principal reason for this is that they have not had instruction or read anything along this line, and to them farm work is a drudgery and the less they hear about it the better. Such persons are not on the farm from choice, but

from necessity and they are ever looking to the city for enjoyment and employment.

In the rural elementary schools of France the teaching of the elements of natural and physical science with their application to agriculture is obligatory. The instruction is based on the observation of facts in country life and on simple experiments with familiar objects. The children should learn above all things else the reason for the operations rather than the manner of performing them. These primary schools reach the masses. The aim of their instruction is to give the greatest number of country children that degree of elementary knowledge, which is essential to enable them to read a modern book on agriculture, or attend an agricultural meeting with profit, and to inspire them with a love of country life so that they may prefer it to that of the city, or the factory.

The element of our education most lacking is the training of the power of observation, and this element is brought into use more in nature study than in any other way.

In placing agriculture in the course of study the question very naturally arises as to where it shall be placed, or what it shall replace? With the introduction of agriculture into the high school course of the township high school it is presumed that the courses in physics, chemistry, botany, and geology will be so shaped as to form an appropriate introduction to the more formal instruction in the different branches of agriculture, i. e., agronomy, zootechny, dairying, rural engineering, and rural economy.

In the report of the Committee on Methods of Teaching Agriculture presented to the Convention of the Association of American Agricultural Colleges and Experiment Stations, held at Atlanta, Ga., October 7-9, 1902, a

course for high schools is suggested in which agriculture replaces two years of Latin, and one year each of advanced physiology, and mathematics. This gives the student four years of agricultural study which would well prepare him for entering an agricultural college, or if intending to take up practical farming at once, would give a good basis upon which to work and to which he could add by special reading or research work when out of school.

T. W. DITTO.

#### **The Ohio Wool Growers' Association.**

The annual meeting of the Ohio Wool Growers' and Sheep Breeders' Association met at the Great Southern Hotel in Columbus, Wednesday, January 14. The afternoon session was devoted entirely to business, but at the evening session an interesting program was rendered consisting of the following addresses and papers: President's address, Colonel J. H. Brigham; "Shall Wool be Washed or Unwashed?" J. W. Cale; "Diseases of Sheep and Some Remedies," H. P. Miller; "Is the Outlook Encouraging for Ohio Wool Growers and Sheep Breeders?" G. W. Glover; "Should Ohio Wool Growers Make an Exhibit at the St. Louis Fair?" W. N. Cowde; "Some Suggestions for Ohio Sheep Breeders," Prof. Charles S. Plumb; "Some Points in Mutton Growing," Lowell Roudebush.

At the call for business an important suggestion was made by Professor Plumb, who called the attention of the members to the fact that Seth Adams in 1807 brought the first Merino sheep west of the Allegheny mountains, coming from Cambridge, Mass., to Zanesville, O., and suggested that this great historic event be commemorated by the erection of a memorial to Mr. Adams in the form of a sheep building, the same to be placed on the University campus,



the money to be raised by public subscription. The suggestion met with decided favor among all those present, the men approving the idea that the College of Agriculture ought to be made the center of the sheep industry of the country, since no State has better opportunities for such a purpose.

The old officers were re-elected and Professor Plumb was made chairman of the Executive Committee.

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### **Ohio Shorthorn Breeders' Association.**

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The sixth annual meeting of the Ohio Shorthorn Breeders' Association met at the Neil House, in Columbus, January 12. The meeting consisted of afternoon and evening sessions, at both of which programs were rendered. At the afternoon meeting President C. L. Gerlaugh gave a very interesting address, and Charles J. Stuckey spoke most entertainingly on the subject of "Live Stock Advertising." These were followed by considerable discussion and numerous short talks.

At the evening session Prof. C. S. Plumb of the University gave an address on "Shorthorn Instruction at the Ohio State University." Emphasis was laid upon the use of shorthorns for classroom demonstrations, the use of score cards in judging, the tracing of pedigrees, etc., and the general methods of instruction in animal industry were discussed.

At the business meeting the officers of the preceding year were re-elected, which are as follows: President, C. L. Gerlaugh; Vice-President, W. I. Wood; Secretary-Treasurer, Charles B. Steward. The Association accepted an invitation to meet at the Ohio State University next year.

### **Root Growth on Alfalfa on the University Farm.**

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Since writing the article on alfalfa for THE STUDENT some time ago I had a letter from one of the prominent alfalfa growers asking me about the tubercles on the roots.

If I had a photograph of the roots and could show cuts of root growth it would be much more satisfactory. The plants grow very strong from the start. All of our alfalfa has been sown on well-manured soil, but none of it has had any of the soil inoculated with soil from land already growing alfalfa or any other kind of legume. Since receiving the inquiry I have examined the roots of the alfalfa on our farm of the first, second and third years' stand.

I find that the nodules (or tubercles) are quite numerous in every case, but that of last year's sowing has very small nodules, while that sown in 1901 and 1902 had good sized nodules, some as large as peas and even larger. The two-year-old alfalfa seems to be forming new tubercles, while some of the old ones seems to be disappearing.

Since writing the last article we have fed all of the mixed silage made of corn and alfalfa described, and it was the best of feed and the cattle seemed to relish it even more than they did pure corn silage.

FRANK RUHLEN.

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### **Meeting of Ohio Jersey Cattle Club.**

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The Ohio Jersey Cattle Club met at the Southern Hotel, Columbus, January 14. There was no fixed program, but a general discussion on subjects of interest. Attention was called to the desirability of an exhibit of Ohio Jerseys at the next State Fair, and it was suggested that a fund be raised for which breeders would compete. A

committee consisting of Professor Plumb and L. P. Bailey, of Belmont, was appointed to take charge of this work. Another committee consisting of F. M. Wilson, of Selma; D. H. Olds, of Springfield, and Professor Plumb, of the University, was appointed to locate a number of high class Jersey cows to be submitted to the committee of the American Jersey Cattle Club at the St. Louis Exposition for taking part in the Jersey test. Other business of importance was also transacted.

Much interest was manifest at the meeting and a goodly number were present.

#### **Russian Agricultural School for Women.**

According to a communication from St. Petersburg, published November 4 in *Die Zeit* (Vienna), the Russian Ministry of Agriculture has decided to found an Agricultural High School for Women, in which the students may receive either a general training as agriculturists or instruction in special branches of agriculture, such as dairy farming, gardening, bee culture, poultry keeping, and cattle and sheep breeding. It will be an indispensable condition for admittance to have passed through a grammar school or similar institution for intermediate education. The course of instruction will occupy three years and will include practical occupation on a model farm in addition to study and laboratory work. The women who pass through this institution will enjoy the same rights as the successful male students of existing high schools. They will consequently be capable of filling various posts under the Ministry of Agriculture and will be further entitled to hold the positions of administrators of the Crown domain and of teachers in the intermediate agricultural schools.—Crop Reporter for December.

## **The Dairy School.**

### **Dairy School Work.**

The Dairy School opened the first of January with a large number of students present who, as a rule, are from several states. The work is progressing very satisfactorily and instructors report very good work on the part of members of the class. E. F. Mangold and B. F. Schmiessing are acting as laboratory assistants, with the same corps of instructors as last year, D. A. Crowner being instructor in buttermaking, and B. B. Herrick in cheesemaking. A new feature will be an instructor in the power house to give the work with the boiler and engine. Several inquiries have already been received for buttermakers and creamerymen from various factories throughout the State, and it is evident that there will be as large a demand as usual for the University Dairy School product. The men in attendance this year are showing an extraordinary amount of interest and the prospects for a most successful term are very promising.

The ninth annual meeting of the Ohio Dairymen's Association will be held in Townshend Hall, February 12 and 13. Several distinct sessions of the meeting will be held, the first of which will be Thursday, February 12, at 10 a. m., the meeting to be addressed by Governor Nash and Mayor Hinkle in addresses of welcome, with a response by L. P. Bailey and an address on "Buttermaking as a Profession," by Professor G. L. McKay of the Iowa Agricultural College. Other sessions will be at 1:30 p. m., Friday, and at 9 a. m. and 1 p. m. and 7 p. m. on Thursday, at which various important

addresses will be given. The 7 o'clock meeting will be held in the University Chapel.

As usual there will be an exhibition of products in Townshend Hall and a large exhibition is expected. All such exhibits should be in by February 8. They will be scored on Wednesday, February 11, so that the report will be ready by Thursday. A very interesting feature of the program this year will be the demonstration of scoring butter and cheese by Professor McKay, which will take place Thursday afternoon at 2 o'clock.

A large attendance is expected at all the meetings and all who attend will be more than repaid for the time spent.

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#### Improved Corn Culture.

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Within the past few years a movement has been started in the direction of improvement of our cereal crops, and there are many men who have toiled long and diligently, to increase the average yield of these crops per acre, but there are very few who have endeavored to accomplish this in a systematic way.

Corn sustains such a vital relation to the agricultural interests of our country and the world, owing to its value as a food, both for animals and men, that its breeding and cultivation along practical and scientific lines is a matter of the greatest importance. This fact brought about the organization of the Illinois Corn Growers' Association, the first report of which has been received at the STUDENT office. From this report the following is of interest:

The association "is an organized body of men interested in the development of corn, the greatest cereal crop in the United States. In the study of the varieties and special characteristics of this plant, it was found that the crop varied very much, the range being from nothing to one hundred bushels or more per

acre. The causes of this variation were found to be numerous. With this in view we are considering the following:

First—Soil conditions.—Want of fertility in many soils has much to do with crop results. It is believed in this time of high priced land and great demand for all food products, that the knowledge of the fact that thin or worn soils may be brought to a high state of fertility by some of the many methods of fertilizing it, ought to be brought to the attention of our many growers of corn as well as a warning to owners of good lands that the wasting of soil fertility, is a crime against present and future generations. The increased use and care of stable and commercial fertilizers, the effects of pasturing and of plowing under leguminous plants, ought all to be considered by the members of this association, and by farmers in general

Second—The better methods of preparing the ground for a crop, the various systems of planting and cultivation are important factors in crop results, and ignorance or neglect in either or all of these, are matters that are causing no little annual loss to the farmers of Illinois.

Third.—Seed. Too much stress cannot be put upon the value of good seed corn. To get good seed corn, it must be selected. Before selecting, the corn grower must know what good seed corn is. Hence the corn judging school, the score card, or the standard of excellence in corn. A man may grow corn all his life and not be able to select a lot of uniform good ears of corn; another may acquaint himself with the proper length, circumference, shape and type of a select ear, the length, purity, and shape of kernel, the size, shape, and color of cob, and the difference between the knowledge of the two will mean a part at least of the difference between a good and a



poor crop. A certificate in three grades from this Corn School shows the skill of the student in corn judging and his ability to select corn that will produce the largest yield.

Fourth.—The Corn Crop.—To produce a perfect ear, a perfect plant must first be secured. Size and height of stalk, number and location of ears on stalk, length of joints, length, and width of foliage must all be taken into consideration as well as the per cent. of barren stalks.

Fifth.—Varieties suited to location, soil conditions, and time of planting may have some effect upon the value of the crop. The acclimation of varieties of corn in changed climatic or soil conditions is a feature of corn growing worthy of the attention of every thoughtful farmer.

Sixth.—Methods of harvesting, marketing and use of the whole crop, both ear and stalk, in such manner as the greatest net profits shall be received, and the greatest amount of fertility of soil be retained are matters worthy of consideration.

Seventh.—The encouragement of the exhibition of corn at all fairs and expositions, that the masses may become more familiar with the varieties best adapted to their respective localities, and with the better types of these varieties.

Believing the amount of systematic energy and enterprise devoted to corn production, as is given, other industries will bring as marked results, we are organized for the study of these and other features of corn investigation as they may be developed, and ask the encouragement and assistance of every one interested in this great cereal."

The first work of the organization was the arrangement of some standard for judging corn. Several standards were provided by the experienced corn growers who were members of the associa-

tion. These score cards served to intensify the interest in corn, especially the selection of seed corn, so that exhibits of seed corn began to increase in numbers and quality very rapidly. This work has also developed an interest in better seed corn, improved methods of cultivation, and more uses for corn products. Owing to the almost unbounded fertility of soil, the pioneer farmer was able to grow large crops of corn with ordinary seed. A more careful rotation of crops became imperative on account of very careless cultivation, exhaustion of the plant food in the soil by continuous cropping, and the advent of noxious weeds and injurious insects. Along with the conservation of soil fertility it has become necessary to keep up the quality of corn by breeding and continuous selection of seed. As the soil becomes more exhausted the character of the corn will deteriorate, without systematic selection of seed and judicious cultivation.

The Illinois Corn Growers' Association is doing a good work and it should have the hearty coöperation of every corn grower, not only in the State of Illinois, but in every other state. By combining their efforts they can accomplish that which the individual cannot and can receive directly the benefits of the latest investigations of the workers on corn subjects. T. L. W.

#### **Foot and Mouth Disease in New England.**

##### **NEW ENGLAND.**

The announcement of the appearance of "Foot and Mouth Disease" in the New England States was officially proclaimed by the Massachusetts Cattle Bureau on November 26, 1902. How the contagion was introduced is not positively known. The most plausible explanation appears to be that the contagion was brought over in hay and bed-

ding with a shipment of horses. Early cases occurred in August. That the disease was not recognized sooner, may be due to the fact that it was not expected, or probably live-stock owners concealed it.

Foot and mouth disease is not a new disease. It was first known in the Old World in 1730, and from that time there has been many outbreaks. A spread of the disease in the United States would mean a national calamity, and it would take years and millions of dollars to stamp it out. While it is known that the cause of the disease is a bacterium, or solid substance, it has never been isolated sufficiently to be studied with the microscope. The germ is *volatile* and fixed, and may be transmitted directly or indirectly to healthy animals. The specific agent is contained in the liquid of the vesicles and ulcerations resulting from the disease in milk, feces, urine, saliva, and in the expired air. In infected stables and manure the germ may preserve its activity for months. It is therefore readily seen that infection can occur in many ways, and these may be divided into two classes—direct and indirect. The period of incubation is from three to six days and the symptoms are very varied, the characteristic ones being confined to the mouth, foot, and udder. Besides these we have high temperature, anorexia, a peculiar gait, similar to that seen in *founder* of the horse. Vesicles soon begin to appear on the upper gums, followed by vesicles and ulcerations on the buccal mucous membrane. These soon rupture and are very sensitive to the touch. An excessive flow of saliva appears and the animal produces a peculiar smacking sound with the mouth. Often the mouth is so sore that mastication cannot take place, or the intestines so badly ulcerated that digestion becomes impossible. The skin of the coronary and

inter-digital region becomes swollen, and in about two days vesicles begin to form. In no two cases are the symptoms exactly alike, and often it takes more money to rid an animal of the after-results and complications of the disease than the animal is worth. The disease itself rarely kills, and only 1 to 3 per cent. of the cases are fatal, but the animal is left by it in a greatly weakened condition, which on a financial basis has been estimated by experts to vary from \$5 to \$50 per head.

Congress appropriated half a million dollars for the eradication of the disease, and the work of the Bureau of Animal Industry has been of a highly commendable type. This is shown by the fact that Great Britain permitted all cattle to land on her shores that were duly inspected by the U. S. Meat Inspectors, so that the export cattle trade to England was not materially interfered with during November and December.

The work of the Bureau of Animal Industry consists in quarantining all infected herds, and destroying them, paying the owner 70 per cent. of the real value. This is a great undertaking involving many details which cannot be entered upon here, and up to the present time nothing but the best results have been obtained, although as yet the disease is not entirely stamped out.

Several former O. S. U. men were called to Boston to aid in this work. Dr. Bennett, O. S. U., '91, was at the head of the inspectors, and controlled all movements. Dr. White and Dr. Fischer were called also, Dr. White having been summoned by the authorities as an expert.

Among the inspectors are Drs. Lavery and Imes, both graduates of O. S. U. N. D., '03.

### **Agricultural Bacteriology.**

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Bacteriology is a science of quite recent origin, and while bacteria were observed and described more than two centuries ago, yet the science of bacteriology may be said to have had its origin within the last quarter of last century. The first bacteria were noticed about the close of the seventeenth century by the German microscopist Seemvenhock, who observed a number of the larger forms which he very accurately represented by drawing and descriptions. He observed only a few species, however, and regarded them as animals. For about one hundred and fifty years after Seemvenhock's time very little interest was taken in the subject, or until about the middle of the present century when Tyndal, Pasteur and others began to study bacteria. At this time and for a number of years afterwards the only forms that were of interest and importance were the disease producing species, and the pathological side of bacteriology was thus first developed, so that this is probably the reason why so many people associate the word bacteria with disease. Within the last two decades, however, it has been discovered that bacteria perform many very important functions in nature besides that of producing disease, and as a result of these discoveries a new branch of bacteriology has been developed, which has to do with many of the fundamental principles in nature, and one of the principle divisions of which is Agricultural Bacteriology.

Bacteria are intimately connected with a very large number of agricultural processes and there have been many important and beneficial changes in agricultural methods due to a knowledge of bacteria. Although rapid progress has been made along this line in recent years, yet it must be said that Agricul-

tural Bacteriology is still in the experimental stage, and the application of the discoveries in this science are more or less uncertain. It is probable, however, that the next decade will see a great increase in the application of these discoveries to practical agriculture. Notwithstanding our incomplete knowledge there is much in the teachings of bacteriology that is reliable and certain, and the knowledge and application of which will greatly benefit the farmer.

There are now over seven hundred different species of bacteria which have been described, and of this number by far the larger proportion are beneficial. While there are many species that are capable of benefiting the farmer immensely, there are also a number of species that are capable of doing much injury, so that it is therefore fundamental that we know something of the conditions of life of bacteria, something of their relations to food, oxygen, temperature, etc., that we may know how they may be controlled.

Soil bacteria are probably the most interesting and important to the farmer, and are one of the most vital factors in nature's food cycle. Soils teem with bacteria and the store of plant food in the earth would soon become exhausted if it were not for their action. They are most abundant in moist soil containing much organic matter, while the number in sandy soil is comparatively small. They are found almost entirely in the surface layers of soil, disappearing almost entirely at a depth of six to ten feet.

Soil bacteria of greatest importance are those whose life processes are connected with the nitrogen supply of the soil and they are classed in two general classes, the Nitrifying and the Denitrifying bacteria. The nitrifying bacteria increase the available nitrogen content of the soil by changing or decompos-



ing organic matter, by fixing the free nitrogen of the air in connection with leguminous plants, or by oxidizing independently of leguminous plants, while the denitrifying bacteria when active cause a loss of nitrogen to the soil. The most favorable conditions for nitrification are the presence of moisture, air and warmth, while the most favorable conditions for denitrification are lack of air, excessive moisture, and a large amount of organic matter. In ordinary soils denitrification is slight, but it may be the cause of a great loss of nitrogen in the manure heap. Good and frequent cultivation which keeps the soil well ventilated is the best possible way of increasing nitrification, and good drainage in a water logged soil would not only stop denitrification but it would better the conditions for nitrification. It should be said too that bacterial action is greatly retarded in soils containing much acid, as bacteria thrive best in a neutral or slightly alkaline medium. The addition of lime to the soil will neutralize the acids present and furnish the conditions for the growth of the nitrifying germs. Manure being alkaline in reaction may produce the same results in acid soils.

Besides the nitrifying and denitrifying germs there are also forms in the soil which aid in the decomposition of rocks, and although the weathering of rocks is a physical process, a part of it is due to the action of bacteria. The whole problem of soil fertility is intimately associated with bacterial processes, and the continuance of soil fertility is therefore made possible by bacterial action. It will be of great value to the farmer of the future to stimulate the growth of those bacteria which are beneficial and to check the growth of those forms which are injurious to agricultural operations.

Soil bacteria, however, are not the only kind that are of importance to the farmer. Dairy bacteriology is an important branch of Agricultural Bacteriology, and the dairy business of the country has been almost revolutionized by the discoveries of bacteriologists. The dairyman of today who knows nothing of bacteria is certainly working in the dark.

Vinegar making, tobacco, curing, silage fermentation, preservation of food products, all these are processes that are associated with bacterial action. Pathogenic bacteriology also is not without its interest to the farmer. There are quite a number of diseases among domestic animals which are of bacterial origin, such as tuberculosis, hog cholera, glanders, tetanus, rabies, hoof and mouth disease and abortion. There are also quite a number of plant diseases that are of bacterial origin. Although the farmer can not be expected to know how to treat all of these diseases, yet if he has a fair understanding of the principles of disinfection, he may be able to prevent the spread of them, and thus not only benefit himself, but the country as a whole.

C. B. H.

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#### **Sheep Purchased by the Department of Animal Industry.**

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At the International Live Stock Exposition at Chicago in December last, eight wether lambs were purchased for instructional work in Animal Husbandry. Four of these were pure bred Cotswolds, bred by Park & Son of Burgessville, Ontario, Canada. The four others were pure bred Shropshires. Three of these were bred by Richard Gibson & Son at Delaware, Ontario, and the other by D. G. & J. G. Hanmer, of Mt. Vernon, Ontario. Among the three purchased from Mr. Gibson was

the first prize Shropshire wether lamb of the International Show, in a ring of over a score. This lamb was later taken to Guelph, Ontario, Canada, where, at the great fat stock show, he won first in his class, first Shropshire special on wether lambs, and helped to win first place for pens of three. This same lamb, and one other of those purchased of Mr. Gibson, composed part of the winning pen of five at the International. The lamb bought of Messrs. Hanmer was fourth in the class in which the lamb above referred to was first, and he also is a very beautiful specimen of the breed.

“The latest estimate places the total number of apple trees of bearing age in the United States at something over two hundred millions. This is nearly three trees to every person. These trees yield more than one hundred and seventy-five million bushels. Not all these apples are consumed at home, for in years of full crop more than three million bushels go abroad. Yet, the apples kept at home are more than two bushels for every adult and child. We are a nation of apple eaters. This fact may not be to our credit, however, when we remember that a good part of all these apples are Ben Davis and other kinds that a refined and cultivated taste would not choose for its dessert. Yet probably half our people never raise an apple; and of the half who do raise them, but a small percentage grows for market; and of those who grow for market, only a part make a profit from the business. Yet there is money in apple growing.”—Country Life in America.

## THE RELATIONS OF FORESTRY AND ZOOLOGY.

By **H. A. Surface**, Professor of Zoology, The Pennsylvania State College.

It is now generally believed that the destruction of our forests is resulting in reduction of the rainfall, and by the removal of roots and leaves water is not absorbed and held in quantities, as previously, and as a result that which falls as rain runs off quickly, soon leaves the hillsides dry and bare, and results in sudden high water or floods. This is certainly one of the causes of the unusually high and sudden floods that have prevailed in this State at various seasons during recent years. Aside from the serious damage to property, the biological effects have been far reaching. Grounds that were formerly damp all the year and produced fall plants with their fruits and seeds in abundance are now dry and practically barren during the fall. This means that only the small plants of spring and early summer grow there, and in the fall there is no food for the insects, birds, and other animals that formerly lived there, and they consequently migrate to other feeding grounds. This is plainly one reason why our game is becoming scarce in certain localities. Also, without trees, gray squirrels and other arboreal animals and birds cannot exist. That is why, in the brush wood, where the large trees have been cleared away, we no longer find animals that were denizens of the deep forest.

The removal of roots and fallen leaves and the failure of the soil to hold much water has resulted in the drying up of many small streams, the decrease of drinking water for living creatures, which has also had an effect in driving them to more favored regions. An-

other serious result has been the interruption of the flow of streams, and a change in their volume and temperatures. This has resulted in a modification of the kinds of vegetation growing in the water as well as changes in the small organisms upon which fishes would feed, and finally in changes in the kinds of fishes inhabiting many of the streams. Many waters that were formerly cool, clear, and of constant and steady flow and consequently inhabited by trout in abundance, are now turbid, warm, of intermittent flow, and filled with green slime in summer, and as a consequence become the lurking places of the mud sucker and the carp.

Another even more disastrous result of the clearing away of our forests and the consequent rush of waters toward the sea has been, in many regions, almost the complete annihilation of such very desirable game fishes as the black bass and pickerel. As these fishes pass the winter in partial hibernation or in a state of quietude, at the bottoms of deep pools. Here they remain until the reviving heat of the sun's rays in the springtime commences to make itself manifest in warming the ground and water. As has been pointed out by President James R. Tyson of the Reading Fish and Protective Association, who is a keeneyed naturalist, the floods of the winter and spring, especially in coal mining regions, carry down immense quantities of "washings," silt, sand and gravel, and deposit them where the current is slower, which is, of course, in the deeper pools. This results in covering and smothering the sluggish fishes at the bottom. There has been a considerable amount of practical proof of this in Pennsylvania during the past year. Another disastrous result of high waters in winter and early spring has been to wash fish out of their places of winter abode and dash them against

rocks and ice, and very often to kill them or leave them stranded in some place where they must die after the water subsides.

The action of the State in buying and setting aside land acres as forest preserves will result not only in the preservation of forestry and the beauty of the landscape, but also in the production of a full rainfall, the retention of moisture, the flowing of springs, the constancy and coolness of small streams, the growing of vegetation throughout the warm season in those areas, the restoration of game and of song and insectivorous birds, the reinhabitation of the trout, the abolition of sudden, high and disastrous floods, and the preservation of the bass, pickerel, and other desirable fishes. Are these not worthy of the most serious effort and best thought that the State can produce?

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#### University News.

Many old students visited the University during the week of the Students' Reunion. Among those from a distance were C. C. Hayden, of Ft. Wayne, Ind., and C. W. Clawson, of Trinidad, Col.

Professors Hunt and Lazenby spent a few days in Washington during the month, the former attending a meeting of the Committee on Exhibits for Agricultural Colleges at the St. Louis Exposition, and the latter the meeting of the American Association for the Advancement of Science.

Professors Decker and Vivian lectured at several dairymen's meetings during the month.

Cards have been received announcing the marriage of Charles N. Mooney, O. S. U., '00, and Jennie Louise Kelley, of Milan, O. Mr. and Mrs. Mooney will be at home in Washington, D. C., after January 15.



Mr. M. O. Bugby is not in school this term, having accepted the position of herdsman on the University farm. This position is a recent creation, it having been made necessary by the extra amount of stock recently purchased and by the great advancement that is being made in the Department of Animal Industry.

Mr. Jay Thompson, O. S. U., ex-'00, visited the University recently. Mr. Thompson, since leaving school, has been in the employ of the government medical division, and has spent much time in travel, having been stationed in that time in Cuba, China, Japan, Turkey and the Philippine Islands.

F. W. Taylor and C. N. Mooney, O. S. U., '00, have been assigned to a new line of work in the Bureau of Soils. They are to have charge of certain experiments in various states, having to do with the adaptation of crops to certain soil types, the introduction of new plants, etc. The work promises much. Both men visited the University recently. Mr. Taylor has been stationed lately in Southern California, and Mr. Mooney in Virginia. Both have returned to Washington.

N. P. Neill is in Arizona working in the soil survey with Macy H. Lapham of the Michigan Agricultural College.

#### **General Agricultural News.**

A live stock judging pavilion is being constructed at Cornell, which will greatly facilitate practical work with animals.

Franklin Sherman, Jr., has been appointed entomologist at the North Carolina Station.

Thorne M. Carpenter, recently of the Massachusetts Station, Leonard R. Cook of Purdue University, and H. L.

Wilson of the University of Virginia, have been appointed assistant chemists at the Pennsylvania Station.

Under the direction of the board of advisers of the faculty and alumni of the New York College of Forestry, a periodical publication, known as "The Forestry Quarterly," has appeared. Its objects are to aid in the establishment of rational forest management, to offer an organ for the publication of technical papers of interest to professional foresters, and by means of abstracts to keep the profession in touch with the current literature and forestry movement in the United States.

In order to encourage the cultivation of plants by children attending elementary schools, the education board of Barbados, British West Indies, has issued a list of prizes to be offered by the Imperial Department of Agriculture. The plants must be grown and cared for by the contestants. The Imperial Department of Agriculture also distributes small packages of seeds to the different schools to aid in the work.

The Missouri Pacific Railroad is furnishing a car for the use of the Missouri College of Agriculture and State Board of Agriculture, to be used in conducting institute meetings among the farmers of the State. The car will contain a complete equipment necessary for the work, such as samples of farm products, charts, photographs, books, etc., besides a lantern for illustrated lectures. The railroad will transport the car wherever desired, and it is expected that great benefit will be derived from the arrangement. Western railroads are generally friendly to all agricultural enterprises or anything that will develop the country.

An examination for Assistant Biologist in the Department of Agriculture and for Chemical Clerk in the food laboratory was held January 27.

## Book Reviews.

THE WEATHER AND PRACTICAL METHODS OF FORECASTING IT. By E. B. Dunn, ex-Forecast Official in Charge of U. S. Weather Bureau, New York, N. Y. Dodd, Mead & Co., New York. Price, \$1.60.

The importance of weather forecasting to the agriculturist is unquestioned, and the great advancement made in the weather bureau in recent years has resulted in untold good to thousands of farmers throughout the country. Practically, however, the farmer is almost entirely dependent upon the bureau for his prognostications, whereas if a few of the important principles of meteorology were known to him, he would often be enabled to predict farther ahead than the single day given by the bureau notices.

This book is intended to set forth these principles in such a way that the agriculturist can easily understand them, and that it has succeeded is plainly evidenced by even a general perusal. Written by "Farmer" Dunn, as he is called, who has long been connected with the government forecast work, the book suggests itself to every thinking agriculturist. It discusses the general meteorological phenomena connected with the atmosphere, takes up the subjects of instruments, temperature, winds, evaporation, precipitation, etc., discusses atmospheric disturbances, storms, weather maps and climate, concluding with a chapter one hundred pages in length on how to foretell weather changes by means of the barometer and local atmospheric conditions, in which are included various practical methods of forecasting which agriculturists should know. The book is scientifically accurate yet sufficiently popular in style to be easily understood by the average layman, and would be an excellent addition to every farmer's library.

## Agricultural Chemicals and Fertilizers.

The market continues firm and steady, with an upward tendency. Southern business is picking up, and prices are well maintained. Nitrates of soda remain strong and sulphates of ammonia are a little stiffer.

## AMMONIATES.

Nitrate of soda, spot, per 100 lbs.....	\$2 05	a	\$2 10
Nitrate of soda, futures, per 100 lbs..	2 00	a	.....
Cottonseed meal, p. ton, c. i. f. N. Y..	27 00	a	28 00
Sulph. ammonia, spot .....	2 05	a	2 07½
Sulph. ammonia, shipment .....	2 05	a	2 07½
Dried blood, New York, low grades..	2 45	a	2 47½
Dried blood, Western, high grade,			
fine ground .....	2 57½a		2 60
Fish scrap, at New York .....	2 55	a	10
Tankage, per unit .....	2 57½	a	2 65 a 10

## PHOSPHATES.

Acid phosphate, per unit .....	55	a	60
Bone black, spot, per ton .....	16 00	a	17 00
Ground bone, per ton .....	21 00	a	23 50
S. C. phosphate rock, ground, per			
2,000 lbs .....	5 00	a	5 50
S. C. phosphate rock, undried, f. o. b.			
Ashley River, 2,400 lbs.....	3 00	a	3 25
do do dried.....	3 25	a	3 50
Florida, high grade phosphate rock,			
f. o. b. Fernandina, per ton.....	6 50	a	7 00
Florida land pebble phosphate rock,			
f. o. b. Fernandina, per ton.....	4 00	a	4 50
Tennessee phosphate, f. o. b. Mt.			
Pleasant, domestic .....	3 25	a	3 50
do do foreign.....	3 75	a	4 00

## POTASH.

Kainit, future shipment, per ton.....	9 05	a	.....
Keiseret, future shipment, per ton....	7 35	a	7 50
Mur. potash, 80 p. c., future shipm't.	1 80	a	.....
Double manure salt (48 a 49 p. c. less			
than 2½ p. c. chlorine), shipment,			
per lb .....	1 09	a	...
			Basis 48 p. c.
High grade manure salt (90 a 93 p. c.			
sulphate potash), shipment.....	2 08	a	.....
			Basis 90 p. c.
Manure salt, in bulk, 20 p. c. per unit,			
O. P.....	62	a	64

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